UPS Overnight Mail

November 18, 2015

Koppers Inc.
Carbon Materials and Chemicals
3900 South Laramie Avenue
Cicero, IL 60804-4523
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Attn: Compliance Tracker, AE 17J
Air Enforcement and Compliance Assurance Branch
U.S. Environmental Protection Agency
Region 5
77 West Jackson Blvd.
Chicago, IL 60604

Re: Section 114 (a) Request
Appendix B submittal
Koppers Inc., Stickney Plant
ID Number: 031300AAJ
CAAPP Permit Number: 96030134

Dear Sir or Madam:

Please find enclosed the Appendix B submittal as required from the received 10/19/15 dated Section 114 (a) request regarding submittal of the Performance Test protocol for RTO 1 and RTO 2.

Should you have any questions or require further information, please contact Stephanie Flynn, Stickney Plant Environmental Manager at (708) 222-3481.

Sincerely,

Jason J. Bakk
Plant Manager

Attachment: Performance Test Protocol for Regenerative Thermal Oxidizer Testing

Copy:

Isaac Smith, ERM
Bernie Evans, ERM
John Irvine, Koppers

Certification by a Responsible Official:

I certify under penalty of law that I have examined and am familiar with the information in the enclosed documents, including all attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are, to the best of my knowledge and belief, true and and complete. I am aware that there are significant penalties for knowingly submitting false statements and information, including the possibility of fines or imprisonment pursuant to Section 113 (c)(2) of the Clean Air Act, and 18 U.S.C. §§ 1001 and 1341.

Signature: _____ 11/18

Name:
Jason J. Bakk

Official Title:
Plant Manager, Koppers Inc. Stickney Plant

Telephone No.:
708-222-3483

Date Signed:
11/18/15

Performance Test Protocol for Regenerative Thermal Oxidizer Testing

Koppers, Inc., Stickney, IL

November 2015

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Delivering sustainable solutions in a more competitive world

ERM

Koppers, Inc.

Performance Test Protocol for Regenerative Thermal Oxidizer Testing

November 2015

Project No.: 0323776

Stickney, IL

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1.0 *INTRODUCTION*

The Koppers, Inc. (Koppers) facility located in Stickney, IL is capable of converting various crude tars into liquid pitch and other liquid products such as creosote, refined tars, chemical oils and various grades of coal tar pitch.

Emission testing is required to be performed per the requirements contained in the Section 114(a) Request to Provide Information Pursuant to the Clean Air Act from the United States Environmental Protection Agency (EPA), received on October 19, 2015.

This test plan is provided in accordance with the requirements in Appendix B of the EPA Section 114 letter. The remainder of this section provides facility and contact information, the testing schedule, and a description of the remaining format of this test plan.

1.1 *FACILITY AND CONTACT INFORMATION*

1.1.1 *Facility Location*

Koppers, Inc.
3900 South Laramie Avenue
Cicero, IL 60804

1.1.2 *Facility Contacts*

Ms. Stephanie Flynn
Plant Environmental Manager
P: 708-222-3481
e-mail: FlynnSM@Koppers.com

1.1.3 *Test Plan Contact*

Mr. Isaac Smith
Project Manager
Environmental Resources Management (ERM)
775 North University Blvd.
Mobile, AL 36608
P: 251-706-8583
F: 888-788-5994
e-mail: isaac.smith@erm.com

1.1.4 *Test Company*

To be determined

1.2 *TEST SCHEDULE*

The schedule for the testing is presented below in Table 1-1.

Table 1-1 Performance Testing Schedule

Action	Date
Submittal of notification of performance test	Within 30 days from the date of receipt of the EPA's Section 114 letter, dated October 19, 2015.
Testing Set-Up	The day before the scheduled testing.
Scheduled Testing	Within 30 days from the date of receipt of EPA's approval test protocol, per the EPA's Section 114 letter.
Testing Contingency	The day after the scheduled testing.
Submittal of emission test report	Within 30 days of completion of the performance tests, per the EPA's Section 114 letter.

1.3 *FORMAT OF TEST PLAN*

The remainder of this test plan provides the following:

- Section 2 – Background information on the Regenerative Thermal Oxidizers (RTO)'s, the process waste gas sampling and analysis, the applicable standards, and other testing requirements.
- Section 3 – Summary of the test program including brief methodology descriptions.
- Section 4 – Proposed quality assurance and quality control (QA/QC) procedures for the test program.
- Section 5 - A description of the format that will be followed to summarize and present collected data and results of the test program.

2.0 *BACKGROUND*

On 19 October 2015, Koppers received an information request under Section 114(a) of the Clean Air Act, issued by the EPA. Emission testing is required to be performed per the requirements contained in the request under Section 114(a) from the EPA, and 40 CFR §63.116(c).

The requirements in Appendix B of the request from the EPA state the testing must be conducted within 30 days from the date of receipt of EPA's approval of this performance test protocol. Additionally, Koppers will notify the EPA and the Illinois Environmental Protection Agency (IEPA) 15 days prior to the testing date.

2.1 *PROCESS VENT*

The RTO's will be tested in order to demonstrate compliance with the requirements set forth in NESHAP 40 CFR §63.113(a)(2).

2.1.1 *Regenerative Thermal Oxidizers A & B*

Per Koppers' Operation and Maintenance Manual (O&M), the RTO's are designed to destroy volatile organic materials by raising the temperature of the contaminated gas stream to a minimum of 871°C/1600°F for a minimum of 1.0 second. The incoming fumes pass upwards through the media, bed, thereby becoming preheated prior to passing around the flame of the natural gas-fired burners. The amount of natural gas burned is controlled by thermocouples in the retention chamber set to maintain 871°C/1600°F operating temperature. The oxidized gas stream then passes downward through the media bed, thereby charging the bed with heat for the next preheat cycle, before being exhausted to atmosphere through a scrubber. The unit is completely insulated for heat retention and personnel safety. A control system is included that is designed to provide safe and economical operation of the system under varying operating conditions.

2.2 *APPLICABLE STANDARDS*

The RTO's described in the previous section must meet the removal destruction efficiency (RDE) set forth in 40 CFR §63.113(a)(2). Koppers will calculate the RDE's by weight-percent on a dry basis, corrected to 3 percent oxygen. The RDE's that will be evaluated for the RTO's during the performance testing described in this test plan is shown below in Table 2-1.

Table 2-1 Applicable Emission Limits

Equipment	Test Location(s)	Emission Limits
RTO-1	Inlet & Outlet	≥ 98% TOC Destruction Efficiency
RTO-2	Inlet & Outlet	≥ 98% TOC Destruction Efficiency

2.3 *REQUIRED MONITORING PARAMETERS*

The EPA has requested that testing be conducted with the RTO's operating at the minimum firebox temperature recommended by the manufacturer. Koppers normally operates the RTO's at a firebox temperature of 1600 °F. The minimum firebox temperature recommended by the manufacturer is 1400 °F. In order for Koppers to conduct the performance testing at maximum representative operating conditions for the RTO's, the facility is requesting to operate the RTO's at the normal firebox operating temperature of 1600 °F.

2.4 *OPERATION DURING TESTING*

As specified in Appendix B of the EPA's Section 114 letter, Koppers will conduct each RTO's performance test at maximum representative operating conditions.

3.0 *TEST PROGRAM*

The stack testing methodology for the RTO's are provided in Table 3-1. More information regarding each method is provided later in this section.

Table 3-1 Test Methodology

Parameter	EPA Method	Number of Runs	Time per Run (min)
Flow	EPA Methods 1 and 2	3	N/A
Carbon Dioxide	EPA Method 3 or 3A	3	60 minimum
Oxygen	EPA Method 3A	3	60 minimum
Moisture content	EPA Method 4	3	60 minimum
Methane and ethane	EPA Method 18	3	60 minimum
Total Organic Content (TOC)	EPA Method 25A	3	60 minimum

Each of the above test methods will be conducted at the inlet and outlet of each RTO.

3.1 *TEST METHODS*

The following test methods found in 40 CFR Part 60, Appendix A may be used during the test program. Brief descriptions of each of these methods follow.

EPA Method 1	Sample and Velocity Traverse for Stationary Sources
EPA Method 2	Determination of Stack Gas Velocity and Volumetric Flowrate (Type S pitot tube)
EPA Method 3	Gas Analysis of Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight
EPA Method 3A	Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)
EPA Method 4	Determination of Moisture Content in Stack Gases
EPA Method 18	Measurement of Gaseous Organic Compound Emissions by Gas Chromatography
EPA Method 25A	Determination of Total Gaseous Organic Concentration using a Flame Ionization analyzer

3.1.1 *EPA Method 1*

For the RTO's, EPA Method 1 will be used to determine the suitability of the flow measurement locations and to determine the flow measurement points.

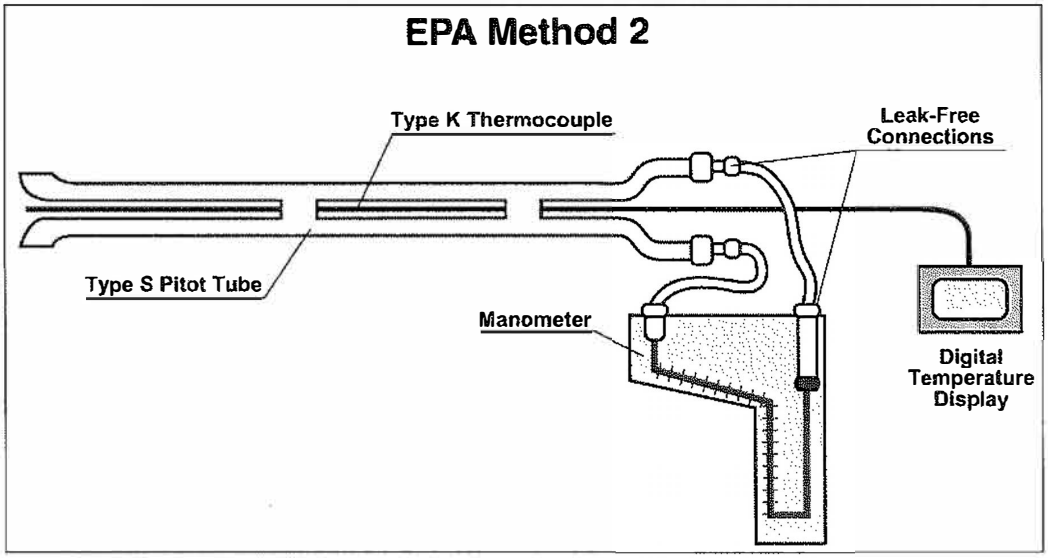
See Section 4.1 of this test plan for more information regarding the RTO inlet and outlet test locations considering EPA Method 1 requirements.

3.1.2 *EPA Method 2*

EPA Method 2 will be used to determine the gas velocity at the RTO inlets and outlets during the course of each EPA Method 18, and 25A run.

In this method, a type-S pitot tube and an inclined plane oil manometer, or potentially a digital micromanometer, will be used for the determinations (refer to Figure 3-1 for classic assembly). If a manometer is used, the manometer will be leveled and "zeroed" prior to each test run. If a digital micromanometer is used, it will be checked to see if it provides a zero reading prior to each test run. The measurement assembly utilizing the oil manometer will be leak checked before and after each run by pressurizing the high side and creating a minimum of a 3-inch deflection on the manometer. The leak check is considered valid if the manometer remains stable for 15 seconds. This procedure will be repeated on the negative side by using vacuum. The velocity head pressure and gas temperature will then be determined at each point specified in EPA Method 1. In addition, the static pressure of the duct and barometric pressure will be measured and recorded.

Figure 3-1 EPA Method 2 Type-S Pitot Tube & Manometer Assembly



3.1.3 *EPA Method 3*

The carbon dioxide content at each location may be determined using EPA Method 3.

In EPA Method 3, one sample will be collected at each test location over the entire length of each EPA Method 4 run. The carbon dioxide content and oxygen content are used to determine the molecular weight of the gas stream, which is then used in the volumetric flowrate calculations. The remainder of the gas stream is assumed to be nitrogen since the quantity of other components in the gas stream are negligible for the purposes of calculating molecular weight.

In this method, gas samples will be collected into an acceptable flexible bag from the back of the EPA Method 4 for the duration of the test runs. Analyses will be performed using an Orsat or Fyrite gas analyzer. The gas analyzer will be leak checked prior to sampling.

3.1.4 *EPA Method 3A*

The oxygen content at each location will be determined using EPA Method 3A. The carbon dioxide content at each location may be determined using EPA Method 3A.

In EPA Method 3A, sampling will be performed continuously over the entire length of each EPA Method 4 run. The carbon dioxide content and oxygen content are used to determine the molecular weight of the gas stream, which is then used in the volumetric flowrate calculations. The remainder of the gas stream is assumed to be nitrogen since the quantity of other components in the gas stream is negligible for the purposes of calculating molecular weight.

In this method, a sample of the gas stream is continuously conveyed to the instruments, one that measures the oxygen concentration and one that measures the carbon dioxide concentration. Zero air, UHP Nitrogen and EPA Protocol gases will be used for all calibration checks. The low-level calibration gas will have a concentration equivalent to less than 20 percent of the calibration span. The mid-level calibration gas will have a concentration equivalent to 40 to 60 percent of the calibration span. The high-level calibration gas sets the calibration span and results in measurements being 20 to 100 percent of the span.

Prior to sampling, a calibration error test will be performed. The zero gas and high level gas will be introduced to the analyzer at the calibration

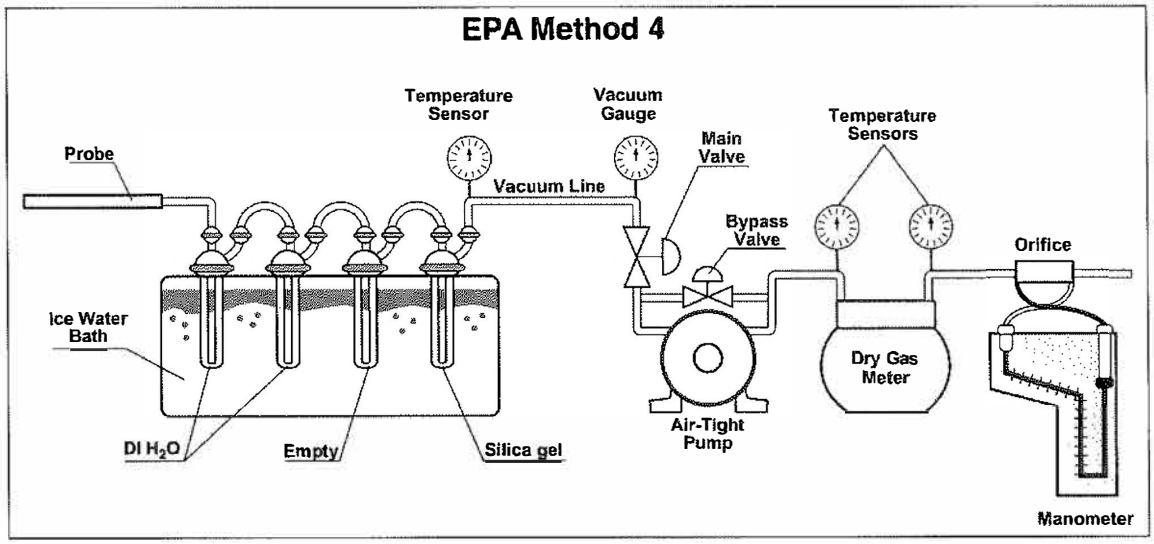
valve assembly and the analyzer set to the appropriate levels. The mid-level gas will also be introduced to the analyzer and the predicted response compared to the actual response of the analyzer. Per the method, an acceptable difference is less than 2 percent of the calibration span. Between each run, the calibration drift and sampling system bias will be determined by introducing two calibration gases at the probe tip through a calibration valve assembly while making no adjustments to the analyzer. Per the method, an acceptable calibration drift is less than or equal to 3 percent of the span value and an acceptable sampling system bias is within ±5 percent of the calibration span.

3.1.5 EPA Method 4

The moisture content will be determined using EPA Method 4 (refer to Figure 3-2 for Sampling Train) for all runs. In this method, a sample of stack gas will be withdrawn from the source, the moisture will be condensed, and the quantity of moisture will be determined volumetrically and/or gravimetrically. To condense the water vapor, the gas sample will pass through a series of impingers (see Figure 3-2).

A sample will be withdrawn from the source at a rate not exceeding 0.75 cubic feet per minute such that a minimum sample volume of 21 dry standard cubic feet will be collected. The volume of dry gas exiting the gas condenser system will be measured with a dry gas meter. The gas meter reading, gas meter inlet and outlet temperatures, gas meter static pressure, and pump vacuum will be recorded at an appropriate interval during each test run. Each test run will last at least one hour. After the test run, the train will be leak checked at the highest vacuum encountered during the test run. A leak check is considered valid if the leak rate is below the lesser of 0.02 cubic feet per minute or 4 percent of the average sample rate.

Figure 3-2 EPA Method 4 Sampling Train



3.1.6 *EPA Method 18*

As specified in Item No: 1.a.v. of Appendix B to the EPA's Section 114 Letter, Method 18 at 40 CFR 60, Appendix A-6, will be used to determine the TOC concentrations in inlets and outlets for RTO's A & B. In Method 18, major organic components of a gas mixture are separated by gas chromatography (GC) and individually quantified by flame ionization, photoionization, electron capture, or other appropriate detection principles. The retention times of each separated component are compared with those of known compounds under identical conditions. Therefore, the analyst confirms the identity and approximate concentrations of the organic emission components beforehand.

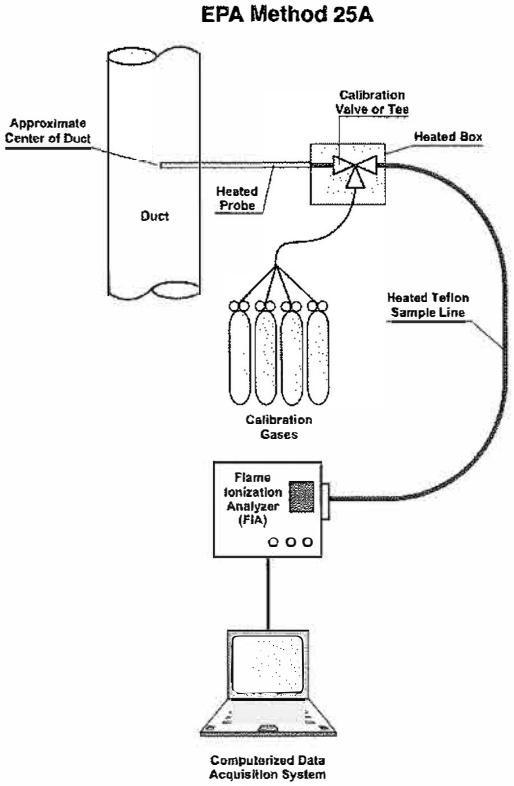
Method 18 will be used to determine the methane and ethane concentration at the RTO's inlets and outlets. The methane and ethane concentrations will be subtracted from the total TOC concentration to yield a non-methane-ethane concentration. This non-methane-ethane concentration will be used to determine the reduction efficiency of each RTO.

3.1.7 *EPA Method 25A*

As specified in Item No: 1.a.v. of Appendix B to the EPA's Request to Provide Information Pursuant to the Clean Air Act, Koppers will determine TOC concentrations from RTO's A & B using Method 25A at 40 CFR 60, Appendix A-7. In Method 25A, a gas sample is extracted from the incinerators through a heated sample line and glass fiber filter to a flame ionization analyzer (FIA). The results are then reported as volume concentration equivalents of the calibration gas or as carbon equivalents.

Note that total organic HAP is an alternative compliance limit for TOC and thus will not be measured.

Figure 3-3 EPA Method 25A Sampling Train



4.0 *QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)*

In order to ensure the emission testing provides reliable data and conclusions, a quality assurance and quality control (QA/QC) program will be followed. The objective of the QA/QC program is to ensure the precision, accuracy, completeness, and representativeness of each measured parameter.
QC procedures consistent with EPA guidelines documented in "Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III Stationary Source-Specific Methods" (EPA/600/R-94/038c) will be adhered to during the test program. QC procedures applicable to field sampling are discussed below followed by a brief discussion of equipment calibrations.

4.1 *FIELD SAMPLING QC PROCEDURES*

The field sampling QC procedures to be followed during the test program are described below. General QC procedures applicable to the entire test program are first detailed. Following the general procedures, QC procedures specific to each of the determinations to be performed during the test program are described.

4.1.1 *General QC Procedures*

The following general QC checks and procedures will be conducted during the compliance testing:

- All sampling equipment will be thoroughly checked to ensure clean and operable components.
- Equipment will be inspected for possible damage from shipment.
- All sampling data will be recorded on pre-formatted data sheets.
- All calibration data forms for all the equipment will be reviewed for completeness and accuracy.
- Any unusual occurrences will be noted during each run on the appropriate data form.
- The field sampling crew leader will review sampling data sheets during testing.

- The sampling ports will be properly sealed to prevent air in-leakage.

- Sampling will be conducted with the probe at the proper pre-determined measurement/sampling point(s).

4.1.2 *QC Procedures for Velocity Determinations*

Data required in determining the velocity of gas at each location will be collected using the methodology specified in EPA Methods 1, 2, and 3 or 3A. QC procedures associated with the use of EPA Method 3A are provided separately in the next section. Field quality control procedures for the aforementioned methods will include:

- The pitot will be visually inspected for damage before and after each test run.

- Each side of the pitot/manometer measurement train will be leak checked before measurements are taken.

- The pitot/manometer measurement train will be visually inspected to ensure proper assembly prior to use.

- The manometer used to indicate the differential pressure across the pitot tube will be leveled and zeroed before each velocity traverse.

- During measurements, the pitot tube will be properly maintained with regard to the traverse line and stack axis.

- The temperature measurement system will be visually checked for damage and operability by measuring the ambient temperature prior to each test.

- If used, the Orsat analyzer will be leak-checked prior to use as specified in EPA Method 3.

4.1.3 *QC Procedures for EPA Method 18 and 25A*

Hydrocarbon concentrations will be determined using EPA Methods 18 and 25A. The following internal checks will be performed in the field as part of the determinations:

- All connections will be confirmed to be tight.

- The selected calibration span values will correspond to the expected concentrations at the exhaust location.

- EPA Protocol 1 gases, within the percentage of calibration span ranges designated in the associated EPA Method, will be used to calibrate the analyzer.

- All sampling components leading to the analyzer shall be maintained at a sufficiently high level to prevent condensation before the instrument.

- An in-stack or heated (sufficient to prevent water condensation) out-of-stack filter will be used.

- Pumps and sample gas manifolds, if used, will be constructed of materials that are nonreactive to the gases being sampled.

- Calibration error tests will be performed after the manufacturer-recommended analyzer warm-up period and within two hours of beginning sampling.

- Sampling will not start until a successful calibration error check is performed.

- No adjustments, except those necessary to achieve the correct calibration gas flow rate at the analyzer, will be made to the sampling system after a successful calibration error check is performed and before the analyzer calibration drift tests are performed.

- Analyzer calibration drift tests will be performed immediately before and after each run. Runs that do not satisfy the applicable criteria will be considered invalid.

- Following any sampling system adjustments or corrective actions, such as those typically required after an invalid analyzer calibration drift test, sampling will not begin until a successful calibration error check has been completed.

- The system will be purged for at least two times the response time before recording any data.

- Samples will be collected from the approximate center of the stack or duct.

4.1.4 *QC Procedures for Moisture Determinations*

The moisture content of the gas streams will be determined using the techniques specified in EPA Method 4. The following internal checks will be performed in the field as part of the moisture determinations:

- The sampling train will be leak-checked before and after each run.
- Ice will be maintained in the ice bath during each run.
- The sampling train will be visually inspected to ensure proper assembly prior to use.
- Proper positioning of the sampling probe will be verified before initiation of sampling.
- Dry gas meter readings, (e.g. delta P, delta H, temperature, and pump vacuum) will be properly maintained and made at each sampling point during testing.
- A post-test orifice calibration check will be performed on the metering system.

4.2 *EQUIPMENT CALIBRATION*

All appropriate gas sampling equipment will be calibrated at the stack tester laboratory prior to shipment to the site, except for the instrumental analyzers, which will be calibrated on site. Calibrations will be performed as described in the EPA publication "Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III Stationary Source-Specific Methods" (EPA/600/R-94/038c). Copies of all calibration certification sheets will be included in the final test report. Calibration certificates will include at a minimum:

- Unique identification of equipment;
- Calibration procedure used;
- Acceptance criteria (if applicable);
- Person performing calibration;
- Date of calibration;
- Calibration due date (if applicable); and

- Standard or natural physical constant used.

4.3 *EXTERNAL QA*

The IEPA and the EPA have the opportunity to perform an on-site evaluation during the testing project. The instrument calibrations, data validation, sample logging, and documentation of quality control data and field maintenance activities may all be evaluated during the testing by IEPA or EPA personnel.

5.0 *RESULTS FORMAT*

Upon completion of testing, the data will be analyzed and results documented in a summary test report. The test report will summarize the test data and analytical results, including test methods and procedures. In addition, the report will present process operating conditions during sampling.

Data will be reduced and analyzed according to procedures and calculation formats as prescribed in the proposed test.

All measured data will be validated based upon the following qualities:

- Representative process conditions during sampling;
- Acceptable sample collection and testing procedure;
- Consistency with expected value(s); and
- Adherence to prescribed quality control procedure.

Data will be validated through comparison of collected data among each of the three sample runs. Any data that is considered suspect or unusual will be identified and the nature of the inconsistency identified and summarized in the test report.

The report will include, at a minimum, the content required by the construction permit and applicable state requirements. The minimum elements are separately shown below.

All the information specified in the Section 114 letter will be included in the report. This information is provided below.

- A brief process description;
- Sampling site description;
- Sampling port locations and dimensions;
- Description of sampling and analysis procedures and any modifications to standard procedures;
- Quality assurance procedures;
- Record of operating conditions during the test;

- RTO firebox temperature in 15-minute increments;
- Record of calibrations;
- Raw data sheets for field sampling;
- Raw data sheets for field and laboratory analyses;
- Documentation of calculations, and any other information required by the test method;
- The name and identification of the affected unit;
- The date and time of the sampling measurements;
- The date any analyses were performed;
- The name of the company that performed the tests;
- Chain of Custody (COC) forms if applicable;
- The test and analytical methodologies used;
- The results of the tests including raw data, and/or analyses including mass emission rate and destruction efficiency calculations;
- The name of any relevant observers present including the testing company's representatives, and Illinois EPA or USEPA representatives, and the representatives of the facility.